Technology Demonstration Fact Sheet
Concrete Grinder

SUMMARY

The Hanford Site C Reactor Technology Demonstration Group demonstrated the Concrete Grinder marketed by CS Unitec (Norwalk, CT). The Concrete Grinder (Model LD 1509 FR) is a hand-held concrete and coating removal tool that includes a 5" diamond grinding wheel and vacuum port for dust extraction, suitable for flat (or slightly curved) walls and floors.
For decommissioning and decontamination (D&D) projects, it can be used for radiological decontamination of large areas or hot spots. The demonstration was done to decontaminate to free release levels two sample rooms in the reactor building.

Comparisons and results of the baseline demonstration and the innovative technical demonstration were as follows:

- Less vibration for the operator
- Hand-held and lightweight
- Increased performance factor of > 150%
- Adaptable to existing HEPA vacuum systems

INNOVATIVE TECHNOLOGY DESCRIPTION

The demonstration was conducted in two sample rooms in the Hanford Site C Reactor building. The model LD 1509 FR grinder marketed by CS Unitec (Norwalk, CT) is a hand-held concrete and coating removal tool that includes a 5: diamond grinding wheel and vacuum port for dust extraction, suitable for flat (or slightly curved) walls and floors. The unit is designed with aerodynamic internal and external air intakes, to be used with a vacuum filtration unit (1 -1/4" vacuum port) for dust-free operations. The LD 1509 FR is rated at 11 amps / 10,000 rpm and weighs only 6 lbs. Depth of grinding is related to stay time and number of passes at any given location.

Performance figures:

- Decontamination Area 54 ft 2
- Total Duration for 1/16" Depth 1.13 hours
- Decontamination Rate 48 ft 2 /hr
- Equivalent Rate for 1/8" Depth 24 ft 2 /hr

BASELINE TECHNOLOGY DESCRIPTION

The baseline demonstration was conducted during October 7, 1997 - through November 3, 1997 in two other C Reactor sample rooms walls and floors.

Both sample rooms required 1/16" - 1/8" concrete removal from floors and walls. Both sample rooms were painted with lead-based paint on the floor only.

The baseline decontamination tools demonstrated were a Pentek pneumatic scaler and scabbler, connected to a vacuum filtration system.

The Pentek Roto-Peen scaler was designed to remove concrete surfaces between 1/16" and 1/4" depths. It contains a flapper device used to strike concrete surfaces. This tool is also useful in hard-to-reach horizontal areas, such as under equipment. The scaler has a port for connecting to a vacuum filtration system. The other pneumatic baseline tool demonstrated was a Pentek scabbler designed to remove concrete surfaces between 1/8" and 1/4" depths. It is a single-piston hand-held scabbler that can reach medium-congested areas and next to wall/floor intersections. It uses vacuum flow design for low dust operations (HEPA suction at striking point).

DEMONSTRATION DESCRIPTION

The Concrete Grinder decontaminated 54 sf of floors and walls in 68 min. It removed 1/16" or more of concrete in easy circular motions. The diamond-tip blades are cooled by innovative external shroud holed, which allows air to pass over the blades and into the internal discharge holes to the vacuum system.

Comparison to Baseline

	Single-Piston Scabbler	Scaler	Concrete Grinder
Sq ft Removed	42	59	54
Depth Removed	1/8"	1/8"	1/16"
Duration of Grinding	11.8 hr	10.3 hr	1.13 hr
Duration for 1/8" depth	11.8 hr	10.3 hr	2.26 hr
Sq ft/min at 1/8" depth	.186	.095	0.40

DETAILS OF BENEFITS

- Decontaminates 0.8 sf/min (48 sf/hour) at a depth of 1/16" on floors and walls.
- Decontaminated most of the 3" of wall/floor interfaces left during the Concrete Shaver demonstration.
- Diamond grinder blades exhibited no noticeable wear after the demonstration
- Leaves a smooth finish that can be more reliably surveyed for release than with the baseline tools

SUCCESS CRITERIA

- Maneuverability around/over wall protrusions
- Simple to deploy, requiring minimal skill levels
- Better production rate than the baseline tools
- Less vibration than the baseline tools
- Light weight

SCHEDULE

The innovative tool was used November 12 & December 1, 1997.

FUTURE APPLICABILITY

The Concrete Grinder system such as the one demonstrated can best be used for decontamination of floors and walls. Potential applications would include concrete walls and floors, such as the Fuel Storage Basin and Transfer Bay areas. The demonstration unit was purchased, to be put in the “tool box”, for more effectively completing project work scope.

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